Name: Date:

Polynomial Factoring solution (version 687)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 12x + 54 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(1)(54)}}{2(1)}$$

$$x = \frac{-(-12) \pm \sqrt{144 - 216}}{2(1)}$$

$$x = \frac{12 \pm \sqrt{-72}}{2}$$

$$x = \frac{12 \pm \sqrt{-36 \cdot 2}}{2}$$

$$x = \frac{12 \pm 6\sqrt{2}\, i}{2}$$

$$x = 6 \pm 3\sqrt{2}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $9 - 4i$ and $5 + 7i$ in standard form ($a + bi$).**

Solution

$$(9 - 4i) \cdot (5 + 7i)$$

$$45 + 63i - 20i - 28i^2$$

$$45 + 63i - 20i + 28$$

$$45 + 28 + 63i - 20i$$

$$73 + 43i$$

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3. **Write function $f(x) = x^3 + 6x^2 - x - 6$ in factored form. I'll give you a hint: one factor is $(x - 1)$.**

Solution

	1	6	-1	-6
1		1	7	6
	1	7	6	0

$$f(x) = (x-1)(x^2+7x+6)$$

$$f(x) = (x-1)(x+6)(x+1)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x+7)^2 \cdot (x+4) \cdot (x+1)$$

Sketch a graph of polynomial $y = p(x)$.